AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims

Claim 1 (Currently Amended): An aluminum ingot casting machine comprising:

a source of molten metal;

a substantially hollow rotatable annular ring, said ring defining a space inside said ring, said annular ring having a generally vertical axis of rotation and being sized and shaped to carry a plurality of ingot casting molds, the annular ring comprising a mold-carrying carousel and a support structure supporting the carousel, the support structure comprising an inner and an outer circular rail; and

a drive means, located substantially outside said space, for indexing said molds to said source of molten metal by rotating said annular ring, the drive means comprising a drive gear means fixed to one of said circular rails, and a drive sprocket for driving said drive gear means.

Claim 2 (Cancelled).

Claim 3 (Previously Presented): An aluminum ingot casting machine as claimed in claim 1 wherein the support structure further includes a plurality of floor mounted support rollers to support said circular rails.

Claim 4 (Previously Presented): An aluminum ingot casting machine as claimed in claim 1 wherein the inner and outer circular rails comprise a floor-mounted inner and a floor-mounted outer circular rail, and wherein the support structure further comprises a plurality of rollers, supported by said rails, supporting said carousel.

Claim 5 (Previously Presented): An aluminum ingot casting machine as claimed in claim 4 wherein said drive means acts between said floor and said carousel, to rotate said annular ring on said support structure.

Claim 6 (Cancelled).

Claim 7 (Cancelled).

Claim 8 (Previously Presented): An aluminum ingot casting machine as claimed in claim 1 wherein the drive gear means comprises a series of cam followers.

Claim 9 (Previously Presented): An aluminum ingot casting machine as claimed in claim 1 wherein said drive sprocket is powered by an AC electric motor.

Claim 10 (Previously Presented): An aluminum ingot casting machine as claimed in claim 9 wherein said motor is controlled by a variable frequency controller.

Claim 11 (Previously Presented): An aluminum ingot casting machine comprising:

a source of molten metal, the source of molten metal comprising at least two pivoting crucibles to permit continuous pouring of molten aluminum;

a rotatable annular ring, said ring defining a space inside said ring, said annular ring having a generally vertical axis of rotation and being sized and shaped to carry a plurality of ingot casting molds;

a drive means, located substantially outside said space, for indexing said molds to said source of molten metal by rotating said annular ring; and

a Y-shaped launder, the launder having first and second receiving portions for receiving molten metal, the first receiving portion being positioned to receive molten metal from one of said crucibles and the second receiving portion being positioned to receive molten metal from another of said crucibles, the launder further comprising a molten metal delivery portion extending between the receiving portions and the carousel.

Claim 12 (Cancelled).

Claim 13 (Previously Presented): An aluminum ingot casting machine as claimed in claim 11 further including a pivoting tundish.

Claim 14 (Original): An aluminum ingot casting machine as claimed in claim 13 wherein said pivoting tundish includes a ceramic nozzle for under pouring said molten metal in said molds.

Claim 15 (Original): An aluminum ingot casting machine as claimed in claim 14 wherein said tundish pivots between a lower pouring position and a raised non-pouring position.

Claim 16 (Original): An aluminum ingot casting machine as claimed in claim 15 further including an automatic skimming apparatus.

Claim 17 (Previously Presented): An aluminum ingot casting machine as claimed in claim 1 further including a water sprayer cooling system located below said annular ring, the cooling system including a plurality of nozzles for spraying water onto said molds.

Claim 18 (Cancelled).

Claim 19 (Previously Presented): An aluminum ingot casting machine as claimed in claim 17 wherein said annular ring includes a steam retaining skirt extending downwardly therefrom.

Claim 20 (Previously Presented): An aluminum ingot casting machine as claimed in claim 17 wherein said nozzles are located above a water tray located beneath the annular ring.

Claim 21 (Original): An aluminum ingot casting machine as claimed in claim 20 wherein said water tray includes an upstanding side wall which is curved in plan view to follow said annular ring and said water tray includes a certain level of water therein.

Claim 22 (Original): An aluminum ingot casting machine as claimed in claim 21 wherein said steam retaining skirt extends below said level of water contained within said water tray wherein steam is trapped below said annular ring by said steam retaining skirt.

Claim 23 (Original): An aluminum ingot casting machine as claimed in claim 22 wherein said water tray includes end walls which define a water free region below said annular ring, said water free region being sized and shaped to permit the pouring and skimming of ingots.

Claim 24 (Original): An aluminum ingot casting machine as claimed in claim 23 wherein said end walls include slots to permit said steam retaining skirt to pass through said end walls.

Claim 25 (Original): An aluminum ingot casting machine as claimed in claim 24 wherein said slots are sized and shaped to control an amount of water that escapes from said water tray through said slots.

Claim 26 (Original): An aluminum ingot casting machine as claimed in claim 25 further including a collection tray to capture water which escapes from said slot for recirculation.

Claim 27 (Original): An aluminum ingot casting machine as claimed in claim 17 wherein said water spray cooling system is sized to permit different amounts of cooling to be provided at different positions around said annular ring.

Claim 28 (Original): An aluminum ingot casting machine as claimed in claim 11 wherein said crucibles are removably placed in tilter frames.

Claim 29 (Original): An aluminum ingot casting machine as claimed in claim 28 wherein said tilter frames include latches to retain the crucibles to the tilter frames when in use.

Claim 30 (Original): An aluminum ingot casting machine as claimed in claim 28 wherein said tilter frames include actuators to tilt the crucibles to pour molten metal into said launder.

Claim 31 (Original): An aluminum ingot casting machine as claimed in claim 28 wherein said tilter frames further include an encoder to measure a tilt position of said crucibles.

Claim 32 (Original): An aluminum ingot casting machine as claimed in claim 31 further including an automatic control for tilting said crucibles in a controlled manner for pouring, based on said position encoder.

Claim 33 (Original): An aluminum ingot casting machine as claimed in claim 32 wherein said controlled manner pouring includes having an adjustor to vary a speed of tilting said crucibles to ensure an even rate of pour of molten metal into said molds.

Claim 34 (Original): An aluminum ingot casting machine as claimed in claim 32 further including a manual control to allow an operator to tilt a crucible to a pouring point before turning on the automatic control.

Claim 35 (Original): An aluminum ingot casting machine as claimed in claim 28 wherein one crucible is larger than the other crucible.

Claim 36 (Original): An aluminum ingot casting machine as claimed in claim 28 wherein said tilting frame automatically returns to an untilted position in the event of a loss of power.

Claim 37 (Original): An aluminum ingot casting machine as claimed in claim 29 wherein said latches include a safety switch to prevent said automatic controller from moving the tilter frames if said latches are not secured.

Claim 38 (Original): An aluminum ingot casting machine as claimed in claim 32 wherein said automatic control causes a second crucible to start pouring upon said first crucible being finished to ensure a substantially continuous flow of molten metal.

Claim 39 (Original): An aluminum ingot casting machine as claimed in claim 16 wherein said skimming apparatus is sized and shaped to remove dross from a surface of each poured ingot, immediately after each ingot is poured.

Claim 40 (Original): An aluminum ingot casting machine as claimed in claim 39 wherein said skimming apparatus is located at a station adjacent to where said molds are poured, in the direction of rotation of said annular ring.

Claim 41 (Original): An aluminum ingot casting machine as claimed in claim 40 wherein said skimming apparatus includes a replaceable spatula for skimming said dross.

Claim 42 (Original): An aluminum ingot casting machine as claimed in claim 41 wherein said station further includes at least one skim pot for discharging said skimmed dross from said spatula.

Claim 43 (Original): An aluminum ingot casting machine as claimed in claim 42 further including a proximity switch for detecting the presence of a mold requiring skimming.

Claim 44 (Original): An aluminum ingot casting machine as claimed in claim 42 wherein there are at least two skim pots with level sensors, and said skimming apparatus fills first one then the other of said skim pots to permit a full skim pot to be removed and emptied.

Claim 45 (Original): An aluminum ingot casting machine as claimed in claim 44 further including a preheater to preheat the spatula prior to skimming.

Claims 46-61 (Cancelled).

Claim 62 (Previously Presented): An aluminum ingot casting machine comprising:

a source of molten metal;

a rotatable annular ring, said ring defining a space inside said ring, said annular ring having a generally vertical axis of rotation and being sized and shaped to carry a plurality of ingot casting molds;

a drive means, located substantially outside said space, for indexing said molds to said source of molten metal by rotating said annular ring;

a demolder means for transferring ingots from said molds and a cooling line for cooling ingots, positioned to receive said ingots from said demolder means, said cooling line including:

a conveyer for moving said ingots along said cooling line;

a cooling tunnel for enclosing said conveyer;

a source of cooling water to spray said ingots moving within said cooling tunnel; and

a countercurrent air flow to provide additional heat exchange with said cooling ingots.

Claim 63 (Original): A machine as claimed in claim 62 wherein said conveyer is a walking beam conveyer, having a walking rail and a stationary rail.

Claim 64 (Original): A machine as claimed in claim 63 wherein said walking rail is moved by a hydraulic actuator.

Claim 65 (Previously Presented): A machine as claimed in claim 62 wherein said cooling line further includes entrance and exit air knives on said cooling tunnel for removing extraneous matter from said ingots.

Claim 66 (Currently Amended): An aluminum ingot casting machine comprising:

a source of molten metal;

a substantially hollow rotatable annular ring, said ring defining a space inside said ring, said annular ring having a generally vertical axis of rotation and being sized and shaped to carry a plurality of ingot casting molds, the annular ring comprising a mold-carrying carousel and a support structure supporting the carousel, the support structure comprising an inner and an outer circular rail; and

a drive means, located substantially outside said space, for indexing said molds to said source of molten metal by rotating said annular ring, the drive means comprising a drive gear means fixed to said carousel, and a drive sprocket for driving said drive gear means.

Claim 67 (Previously Presented): An aluminum ingot casting machine as claimed in claim 66 wherein the support structure further includes a plurality of floor mounted support rollers to support said circular rails.

Claim 68 (Previously Presented): An aluminum ingot casting machine as claimed in claim 66 wherein the inner and outer circular rails comprise a floor-mounted inner and a floor-mounted outer circular rail, and wherein the support structure further comprises a plurality of rollers, supported by said rails, supporting said carousel.

Claim 69 (Previously Presented): An aluminum ingot casting machine as claimed in claim 68 wherein said drive means acts between said floor and said carousel, to rotate said annular ring on said support structure.